

CLAIMS

1. An immersion lithography method in which an optical exposure system is used to expose a photoresist layer during an exposure period, an immersion medium is inserted between the optical exposure system and the photoresist layer (20) to be exposed and, after exposure, the photoresist layer is developed using a developer, characterized in that the method comprises the step of providing the photoresist layer (20) with a shield layer (30) to prevent contact between the photoresist layer (20) and the immersion medium, said shield layer being transparent at the exposure wavelength and being impervious to the immersion medium.
10
2. An immersion lithography method according to claim 1, wherein the shield layer (30) is formed of a material that is insoluble in the immersion medium to a degree sufficient to prevent the immersion medium from contacting the photoresist layer (20) during the exposure period.
15
3. An immersion lithography method according to claim 1 or 2, wherein the shield layer (30) is formed of a material that is removed by the developer.
- 20 4. An immersion lithography method according to claim 3, wherein the immersion medium is water, the developer is tetramethylammonium hydroxide and the shield layer (30) is formed of a material having pH-dependent solubility.
- 25 5. An immersion lithography method according to claim 4, and comprising the step of providing the photoresist layer (20) with the shield layer (30) by coating the photoresist layer (20) with the shield layer material, then applying a chemical or physical process to render the shield layer insoluble in water to a degree sufficient to prevent the water immersion medium from contacting the photoresist layer (20) during the exposure period.
30
6. An intermediate product adapted for exposure in an immersion lithography process employing a particular immersion fluid, the product consisting of a substrate

(10) bearing a photoresist layer (20), characterized in that the surface of the photoresist layer (20) remote from the substrate (10) is covered by a shield layer (30) which is transparent at the exposure wavelength used in the immersion lithography process and impervious to said particular immersion medium.

5

7. The intermediate product of claim 6, wherein the shield layer material is chosen such that it is insoluble in said particular immersion medium to a degree sufficient to prevent the immersion medium from contacting the photoresist layer (20) during the exposure period..

10

8. The intermediate product of claim 6 or 7, wherein the shield layer material is chosen such that a common developer can remove the shield layer (30) and develop the photoresist layer (20).

15

9. The intermediate product of claim 8, wherein the shield layer is formed of a material having pH-dependent solubility.

15

10. The intermediate product of any one of claims 6 to 9, wherein said particular immersion medium is water, and the shield layer (30) is formed of a material which is 20 impervious to water.